

FIG. 1

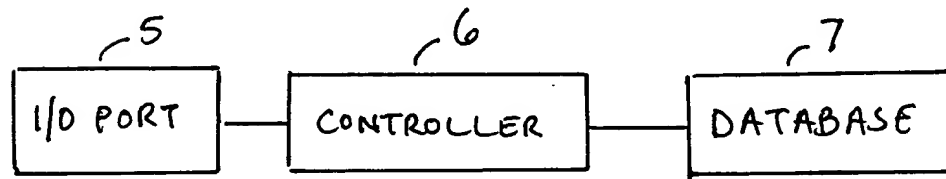


FIG. 2A

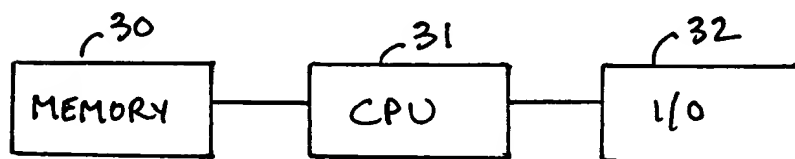
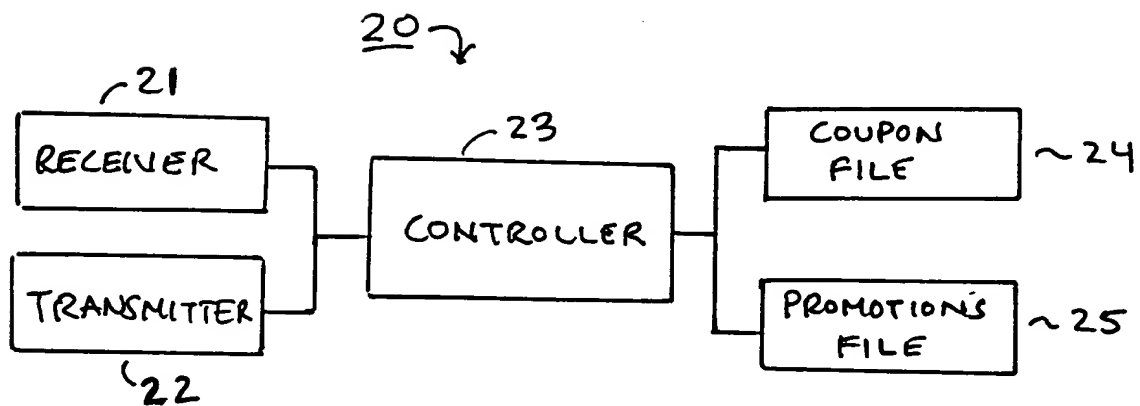
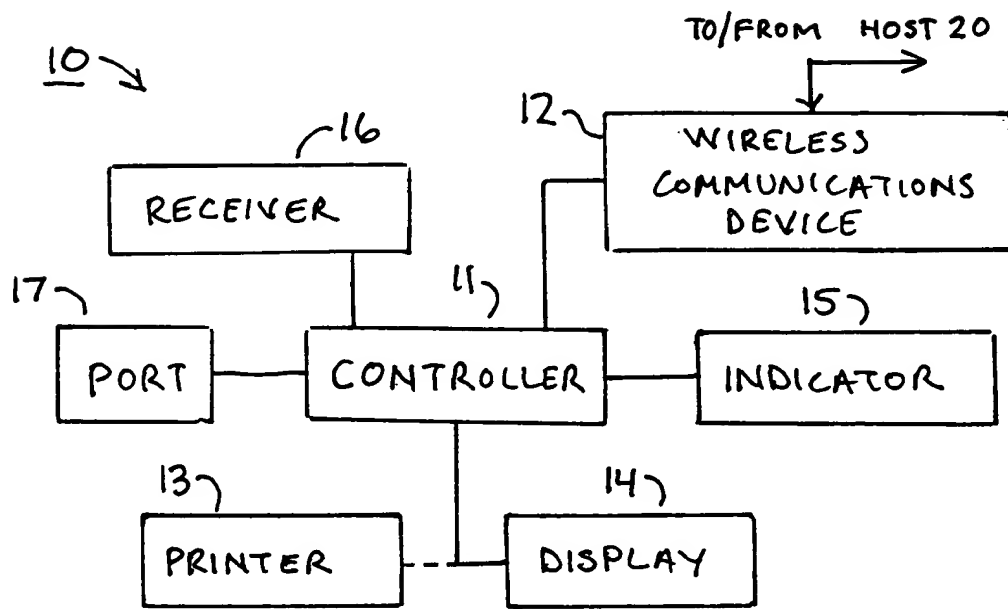


FIG. 2B



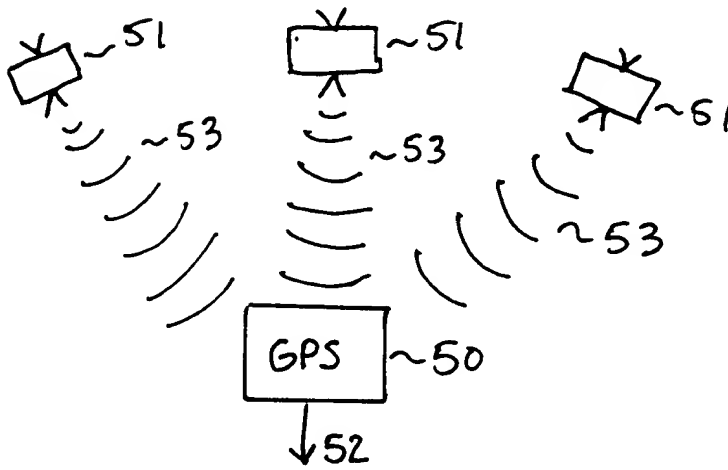
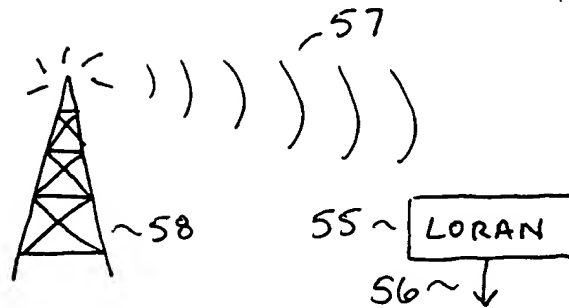


FIG. 5A



F16. 5B

Figure 1. The 12 test items of the TAP. The items are arranged in a 4x3 grid. Each item consists of a diagram of a mechanical system (a spring-mass-damper system) and a corresponding differential equation. The items are labeled 1 through 12. The diagrams show a mass m connected to a wall by a spring with constant k and a damper with coefficient c . The displacement from equilibrium is x . The equations are:

- $m\ddot{x} + c\dot{x} + kx = 0$
- $m\ddot{x} + c\dot{x} + kx = F\cos(\omega t)$
- $m\ddot{x} + c\dot{x} + kx = F\sin(\omega t)$
- $m\ddot{x} + c\dot{x} + kx = F\cos(\omega t) + F\sin(\omega t)$
- $m\ddot{x} + c\dot{x} + kx = F\cos(\omega t) + F\sin(\omega t) + F\cos(\omega t)$
- $m\ddot{x} + c\dot{x} + kx = F\cos(\omega t) + F\sin(\omega t) + F\cos(\omega t) + F\sin(\omega t)$
- $m\ddot{x} + c\dot{x} + kx = F\cos(\omega t) + F\sin(\omega t) + F\cos(\omega t) + F\sin(\omega t) + F\cos(\omega t)$
- $m\ddot{x} + c\dot{x} + kx = F\cos(\omega t) + F\sin(\omega t) + F\cos(\omega t) + F\sin(\omega t) + F\cos(\omega t) + F\sin(\omega t)$
- $m\ddot{x} + c\dot{x} + kx = F\cos(\omega t) + F\sin(\omega t) + F\cos(\omega t) + F\sin(\omega t) + F\cos(\omega t) + F\sin(\omega t) + F\cos(\omega t)$
- $m\ddot{x} + c\dot{x} + kx = F\cos(\omega t) + F\sin(\omega t) + F\cos(\omega t) + F\sin(\omega t) + F\cos(\omega t) + F\sin(\omega t) + F\cos(\omega t) + F\sin(\omega t)$
- $m\ddot{x} + c\dot{x} + kx = F\cos(\omega t) + F\sin(\omega t) + F\cos(\omega t) + F\sin(\omega t) + F\cos(\omega t) + F\sin(\omega t) + F\cos(\omega t) + F\sin(\omega t) + F\cos(\omega t)$
- $m\ddot{x} + c\dot{x} + kx = F\cos(\omega t) + F\sin(\omega t) + F\cos(\omega t) + F\sin(\omega t) + F\cos(\omega t) + F\sin(\omega t) + F\cos(\omega t) + F\sin(\omega t) + F\cos(\omega t) + F\sin(\omega t)$

FIG. 6A



FIG. 6B

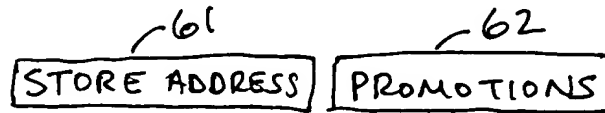


FIG. 6C

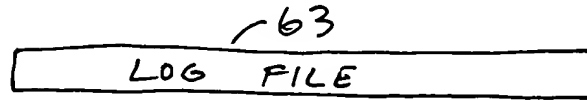


FIG. 6D

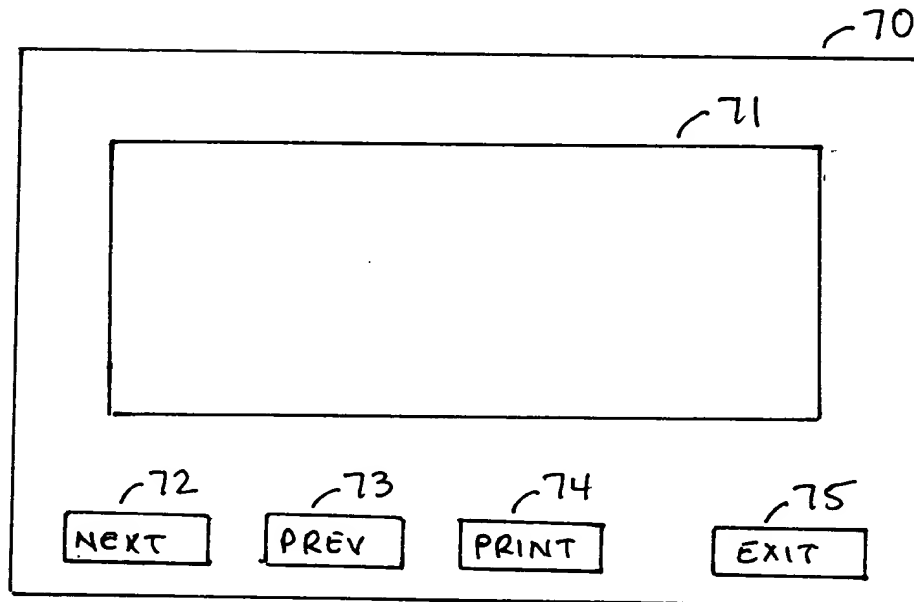
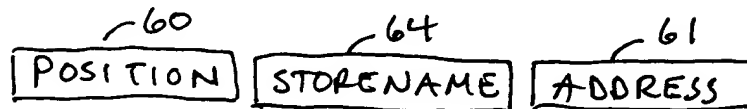


FIG. 7

